Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1-14 (canceled)

Claim 15 (currently amended)   A method for detecting and geographically locating a rogue user accessing a wireless computer network wirelessly, where the wireless computer network comprises a server computer system and a plurality of wireless access points via which a wireless computer workstation accesses the server computer system, the method comprising:

deploying a Network Management System (NMS) into the server computer system for collecting Media Access Control (MAC), Internet Protocol (IP) addresses of computer workstations and access points connected onto the network, and the performance characteristics of the computer workstations and access points;

detecting a rogue user by comparing the collected MAC and IP addresses with a reference set of valid addresses of authorized users, wherein a user with addresses not on the reference set is considered as the rogue user;

determining the nearest wireless access point serving the rogue user by performing a logical AND operation between the collected IP address and the subnet mask of the rogue user;

determining the geographical location of the rogue user with reference to the nearest wireless access point by a ranking algorithm that derives at least one performance index for the rogue user from the collected performance characteristics of the rogue user and compares the performance index of the rogue user with the average of the reference performance indices of each island mapped near the nearest access point in a spatial performance model pertinent to the time of day of detection;

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wherein the spatial performance model having a plurality of islands is constructed dynamically by the following operations, comprising:

collecting and mapping out the performance characteristics of wireless computer workstations in the plurality of islands in the area covered by the wireless access points of the network;

measuring at least one network performance parameter of the performance characteristics for each island, wherein each island shares the same performance characteristics; and

deriving a performance index for each island based on the at least one performance parameter to obtain the spatial performance model; and

alerting the administer of the network for taking security measures against the located rogue user.

pre-collecting and pre-mapping performance parameters of wireless computers with respect to at least one access point within a geographical area covered by the wireless computer network;

obtaining a spatial performance model for the geographical area based on the collected performance parameters, the spatial performance model is defined by a plurality of islands, each island shares substantially the same performance parameters;

identifying the user based at least on a Media Access Control (MAC) address and Internet Protocol (IP) address;

acquiring at least one performance parameter of the user;

mapping and matching the at least one performance parameter acquired for the user on the spatial performance model to identify the matched island; and

identifying a geographical location of the user through the matched island.

Claim 16 (cancelled).

Claim 17 (currently amended) The method according to claim ~~16~~ 15, wherein deriving the ~~network~~ performance index of the rogue user and each island, comprising:

obtaining differences between the ~~acquired~~ collected performance parameters of the rogue user and the performance parameters in the spatial performance model;

determining a minimum value for each difference;

normalizing the acquired performance parameters for each difference to obtain a rank number; and

summing the rank number for each island to obtain the ~~network~~ performance index.

Claim 18 (currently amended) The method according to claim ~~16~~ 15, wherein deriving the ~~network~~ performance index of the rogue user and each island, comprising

determining a minimum values of each performance parameter in the spatial performance model;

normalizing the values of each performance parameter in the spatial performance model and the ~~acquired~~ collected performance parameters of the rogue user to obtain the rank numbers;

obtaining the differences between the rank numbers of performance parameters in the spatial performance model and the ~~acquired~~ collected performance parameters of the rogue user; and

summing the differences for each island to obtain the ~~network~~ performance index.

Claim 19 (cancelled).

Claim 20 (cancelled).

Claim 21 (cancelled).

Claim 22 (cancelled).

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Claim 23 (currently amended) The method according to claim ~~16~~ 15, wherein deriving of the at least one performance index comprising dynamically re-mapping the islands previously mapped based on a current performance index of each island at time intervals.

Claim 24 (cancelled).

Claim 25 (cancelled).

Claim 26 (cancelled).

Claim 27 (currently amended) The method according to claim 15, wherein the performance parameters includes variables defined at any of a physical layer, a network layer, an application layer and a data link layer.

Claim 28 (previously presented) The method according to claim 27, wherein the physical layer includes any or all of signal strength, noise power and signal-to-noise ratio.

Claim 29 (previously presented) The method according to claim 27, wherein the network layer includes any or all of ping response time, packet round-trip time, packet loss rate and propagation delay times.

Claim 30 (previously presented) The method according to claim 27, wherein the application layer includes any or all of transactions responses, applications responses and end-to-end delay times.

Claim 31 (previously presented) The method according to claim 27, wherein the data link layer includes any or all of link utilization, frame loss rate, number of error frames and throughput rate.

Claim 32 (cancelled).

Claim 33 (previously presented) The method according to claim 15, wherein the performance parameters include any of distance from access point, number of wireless users, network topology, building material used and time of day.

Claim 34 (currently amended) A wireless computer network system for being capable of detecting and geographically locating a rogue user accessing-a the wireless computer network, having at least one wireless access point wirelessly, the system comprising:

a server computer system with a computer readable medium; and

a plurality of wireless access points via which wireless computer workstations access the server computer system:

wherein the computer readable medium is embedded with computer executable programs including:

a Network Management System (NMS) program for collecting Media Access Control (MAC), Internet Protocol (IP) addresses of computer workstations and access points connected onto the network, and the performance characteristics of the computer workstations and access points;

a program for detecting a rogue user by comparing the collected MAC and IP addresses with a reference set of valid addresses of authorized users, wherein a user with addresses not on the reference set is considered as the rogue user;

a program for determining the nearest wireless access point serving the rogue user by performing a logical AND operation between the collected IP address and the subnet mask of the rogue user;

a program for determining the geographical location of the rogue user with reference to the nearest wireless access point by a ranking algorithm that derives at least one performance index for the rogue user from the collected performance characteristics of the rogue user and compares the performance index of the rogue user with the average of the reference performance indices of each island mapped near the nearest access point in a spatial performance model pertinent to the time of day of detection;

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wherein the spatial performance model having a plurality of islands is constructed dynamically by a program comprising:

collecting and mapping out the performance characteristics of wireless computer workstations in the plurality of islands in the area covered by the wireless access points of the network;

measuring at least one network performance parameter of the performance characteristics for each island, wherein each island shares the same performance characteristics; and

deriving a performance index for each island based on the at least one performance parameter to obtain the spatial performance model; and

a program for alerting the administer of the network for taking security measures against the located rogue user.

a network management system residing on a computer system of the wireless computer network, the network management system operationally detects users accessing to the wireless computer network and acquires one or more performance parameters of the users;

a spatial performance model defining a plurality of islands of performance parameters, the performance parameters are obtained through pre-collecting and pre-mapping over a geographical area covered by the wireless computer network;

wherein the network management system operationally detects users and identifies at least a MAC address and IP address of the users and acquiring at least one performance parameter of the users, the system is operable to map and match the at least one performance parameter acquired for the user on the spatial performance model to identify a matched island for each user, thereby identifying a geographical location of the user through the matched island.

Claim 35 (cancelled).

Claim 36 (cancelled).

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Claim 37 (currently amended) The ~~system~~ network according to claim ~~36~~ 34, wherein the ~~network~~ performance index ~~is a sum of rank number of each island, wherein the rank number is obtained through normalizing the acquired performance parameters by a differences between the acquired performance parameters of the user and the performance parameters in the spatial performance model.~~ of the rogue user and each island, comprising:

obtaining differences between the collected performance parameters of the rogue user and the performance parameters in the spatial performance model;

determining a minimum value for each difference;

normalizing the acquired performance parameters for each difference to obtain a rank number; and

summing the rank number for each island to obtain the performance index.

Claim 38 (currently amended) The ~~system~~ network according to claim ~~36~~ 34, wherein the ~~network~~ performance index ~~is a sum of differences of rank numbers of performance parameters in the spatial performance model and the acquired performance parameters of the user, of which, the performance parameters of the spatial performance model and the users are normalized by a minimum values of each performance parameter in the spatial performance model.~~ of the rogue user and each island, comprising

determining a minimum values of each performance parameter in the spatial performance model;

normalizing the values of each performance parameter in the spatial performance model and the collected performance parameters of the rogue user to obtain the rank numbers;

obtaining the differences between the rank numbers of performance parameters in the spatial performance model and the collected performance parameters of the rogue user; and

summing the differences for each island to obtain the performance index.

Claim 39 (cancelled).

Claim 40 (cancelled).

Claim 41 (currently amended) The ~~system~~ network according to claim 34, wherein the islands previously mapped are dynamically re-mapped based on a current performance index of each island at time intervals.

Claim 42 (cancelled).

Claim 43 (currently amended) The ~~system~~ network according to claim 34, wherein the performance parameters includes variables defined at any of a physical layer, a network layer, an application layer and a data link layer.

Claim 44 (currently amended) The ~~method~~ network according to claim 34, wherein the physical layer includes any or all of signal strength, noise power and signal-to-noise ratio.

Claim 45 (currently amended) The ~~method~~ network according to claim ~~44~~ 43, wherein the network layer includes any or all of ping response time, packet round-trip time, packet loss rate and propagation delay times.

Claim 46 (currently amended) The ~~method~~ network according to claim ~~44~~ 43, wherein the application layer includes transactions responses, applications responses and end-to-end delay times.

Claim 47 (currently amended) The ~~method~~ network according to claim ~~44~~ 43, wherein the data link layer includes any of link utilization, frame loss rate, number of error frames and throughput rate.

Claim 48 (currently amended) The ~~method~~ network according to claim 34, wherein the spatial performance model differs at a particular period of the day.

Claim 49 (currently amended) The ~~method~~ network according to claim 34, wherein the performance parameters include any of distance from access point, number of wireless users, network topology, building material used and time of day.